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# 1 [Posters and demonstrations: Developing usable CAPTCHAs for blind users](#)



Jonathan Holman, Jonathan Lazar, Jinjuan Heidi Feng, John D'Arcy

October 2007 **Proceedings of the 9th international ACM SIGACCESS conference on Computers and accessibility Assets '07**

Publisher: ACM Press

Full text available: pdf(322.33 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

CAPTCHAs are widely used by websites for security and privacy purposes. However, traditional text-based CAPTCHAs are not suitable for individuals with visual impairments. We proposed and developed a new form of CAPTCHA that combines both visual and audio information to allow easy access by users with visual impairments. A preliminary evaluation suggests strong potential for the new form of CAPTCHA for both blind and visual users.

**Keywords:** CAPTCHA, accessibility, blind user, security, turing test, universal usability, usability, visual impairment

## 2 [Poster 2: applications track: IMAGINATION: a robust image-based CAPTCHA generation system](#)



Ritendra Datta, Jia Li, James Z. Wang

November 2005 **Proceedings of the 13th annual ACM international conference on Multimedia MULTIMEDIA '05**

Publisher: ACM Press

Full text available: pdf(308.63 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

We propose IMAGINATION (IMAGE Generation for INternet AuthenticaTION), a system for the generation of attack-resistant, user-friendly, image-based CAPTCHAs. In our system, we produce controlled distortions on randomly chosen images and present them to the user for annotation from a given list of words. The distortions are performed in a way that satisfies the incongruous requirements of low perceptual degradation and high resistance to attack by content-based image retrieval systems. Word choice ...

**Keywords:** CAPTCHA, automated turing test, image retrieval

### 3 Keeping bots out of online games



Philippe Golle, Nicolas Ducheneaut

June 2005 **Proceedings of the 2005 ACM SIGCHI International Conference on Advances in computer entertainment technology ACE '05**

**Publisher:** ACM Press

Full text available: pdf(133.20 KB) Additional Information: [full citation](#), [abstract](#), [references](#)

We study the problem of restricting participation in online games to human players, so they can enjoy the game without interference from automated playing agents known as bots. We propose a range of techniques, both software and hardware based, to distinguish bots from human players in a wide variety of online games, from poker to "shoot'em ups."

### 4 Games: Preventing bots from playing online games



Philippe Golle, Nicolas Ducheneaut

July 2005 **Computers in Entertainment (CIE)**, Volume 3 Issue 3

**Publisher:** ACM Press

Full text available: pdf(210.16 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

As multiplayer online gaming gains in economic and social importance, an increasingly large number of players is beginning to rely on bots (automated player agents) to gain unfair advantages in games. In this article we study the problem of restricting participation in online games to human players so they can enjoy the game without interference from the bots. We propose two broad approaches to prevent bots from playing online games. The first consists of seamlessly integrating software-based te ...

**Keywords:** CAPTCHAs, agents, bots, games, reverse Turing test

### 5 Telling humans and computers apart automatically



Luis von Ahn, Manuel Blum, John Langford

February 2004 **Communications of the ACM**, Volume 47 Issue 2

**Publisher:** ACM Press

Full text available: pdf(106.33 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)  
 html(18.53 KB)

How lazy cryptographers do AI.

### 6 Session M1: privacy in e-commerce: Security when people matter: structuring incentives for user behavior



Rick Wash, Jeffrey K. Mackie-Mason

August 2007 **Proceedings of the ninth international conference on Electronic commerce ICEC '07**

**Publisher:** ACM Press

Full text available: pdf(301.07 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Humans are "smart components" in a system, but cannot be directly programmed to perform; rather, their autonomy must be respected as a design constraint and incentives provided to induce desired behavior. Sometimes these incentives are properly aligned, and the humans don't represent a vulnerability. But often, a misalignment of incentives causes a weakness in the system that can be exploited by clever attackers. Incentive-centered design tools help us understand these problems, and provide d ...

**Keywords:** botnets, captcha, design, economics, incentives, security, spam

Towards Blocking Outgoing Malicious Impostor Emails

Erhan J. Kartaltepe, Shouhuai Xu

June 2006 **Proceedings of the 2006 International Symposium on on World of Wireless, Mobile and Multimedia Networks WOWMOM '06**

Publisher: IEEE Computer Society

Full text available:  pdf(320.41 KB) Additional Information: [full citation](#), [abstract](#), [index terms](#)

Electronic mails (emails) have become an indispensable part of most people's daily routines. However, they were not designed for deployment in an adversarial environment, which explains why there have been so many incidents such as spamming and phishing. Malicious impostor emails sent by sophisticated attackers are perhaps even more damaging, because their contents, except the attachments, may look perfectly legitimate while silently targeting certain critical information such as cryptographic k ...

8 Communication privacy: How to achieve blocking resistance for existing systems enabling anonymous web surfing

Stefan Köpsell, Ulf Hillig

October 2004 **Proceedings of the 2004 ACM workshop on Privacy in the electronic society WPES '04**

Publisher: ACM Press

Full text available:  pdf(897.66 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

We are developing a blocking resistant, practical and usable system for anonymous web surfing. This means, the system tries to provide as much reachability and availability as possible, even to users in countries where the free flow of information is legally, organizationally and physically restricted. The proposed solution is an add-on to existing anonymity systems. First we give a classification of blocking criteria and some general countermeasures. Using these techniques, we outline a conc ...

**Keywords:** AN.ON, JAP, Mix, blocking resistance9 Multi-agent systems and social behavior: Blind sales in electronic commerce

E. Aïmeur, G. Brassard, F. S. Mani Onana

March 2004 **Proceedings of the 6th international conference on Electronic commerce ICEC '04**

Publisher: ACM Press

Full text available:  pdf(330.05 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#)

We start with the usual paradigm in electronic commerce: a consumer who wants to buy from a merchant. However, both parties wish to enjoy maximal privacy. In addition to remaining anonymous, the consumer wants to hide her browsing pattern and even the identification of the product she may decide to buy. Nevertheless, she wants to be able to negotiate the price, pay, receive the product and even enjoy maintenance on it. On the other hand, the merchant wants to leak as little information as possib ...

**Keywords:** CAPTCHA, anonymous surfing, cryptography, customer buying behaviour, electronic commerce, oblivious transfer, private information retrieval10 Session 1: On instant messaging worms, analysis and countermeasures

Mohammad Mannan, Paul C. van Oorschot

November 2005 **Proceedings of the 2005 ACM workshop on Rapid malware WORM '05**

Publisher: ACM Press

Full text available:  pdf(186.53 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

We provide a collection of minor results on the area of Instant Messaging (IM) worms, which has received relatively little attention in the formal literature. We review selected IM worms and summarize their main characteristics, motivating a brief overview of the network formed by IM contact lists, and a discussion of theoretical consequences of worms in such networks. Existing methods to restrict an IM worm epidemic are analyzed in terms of usability and effectiveness, leading to the suggestion ...

**Keywords:** instant messaging worms, scale-free networks

#### 11 DDoS defense by offense



Michael Walfish, Mythili Vutukuru, Hari Balakrishnan, David Karger, Scott Shenker  
August 2006 **ACM SIGCOMM Computer Communication Review , Proceedings of the 2006 conference on Applications, technologies, architectures, and protocols for computer communications SIGCOMM '06**, Volume 36 Issue 4

**Publisher:** ACM Press

Full text available: pdf(334.96 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

This paper presents the design, implementation, analysis, and experimental evaluation of *speak-up*, a defense against *application-level* distributed denial-of-service (DDoS), in which attackers cripple a server by sending legitimate-looking requests that consume computational resources (e.g., CPU cycles, disk). With *speak-up*, a victimized server encourages all clients, resources permitting, *to automatically send higher volumes of traffic*. We suppose that attackers are a ...

**Keywords:** DoS attack, bandwidth, currency

#### 12 Secure distributed human computation



Craig Gentry, Zulfikar Ramzan, Stuart Stubblebine  
June 2005 **Proceedings of the 6th ACM conference on Electronic commerce EC '05**

**Publisher:** ACM Press

Full text available: pdf(257.80 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

This paper is a preliminary exploration of secure distributed *human* computation. We consider the general paradigm of using large-scale distributed computation to solve difficult problems, but where humans can act as agents and provide candidate solutions. We are especially motivated by problem classes that appear to be difficult for computers to solve effectively, but are easier for humans; e.g., image analysis, speech recognition, and natural language processing. This paradigm already se ...

**Keywords:** B24b, human distributed computation

#### 13 DOS protection: Using graphic turing tests to counter automated DDoS attacks against web servers



William G. Morein, Angelos Stavrou, Debra L. Cook, Angelos D. Keromytis, Vishal Misra, Dan Rubenstein  
October 2003 **Proceedings of the 10th ACM conference on Computer and communications security CCS '03**

**Publisher:** ACM Press

Full text available: pdf(256.83 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citings](#), [index terms](#)

We present WebSOS, a novel overlay-based architecture that provides guaranteed access to a web server that is targeted by a denial of service (DoS) attack. Our approach exploits two key characteristics of the web environment: its design around a human-centric

interface, and the extensibility inherent in many browsers through downloadable "applets." We guarantee access to a web server for a large number of *previously unknown* users, without requiring pre-existing trust relationships between ...

**Keywords:** Java, graphic turing tests, web proxies

14 Authentication and authorization: Securing passwords against dictionary attacks



Benny Pinkas, Tomas Sander

November 2002 **Proceedings of the 9th ACM conference on Computer and communications security CCS '02**

**Publisher:** ACM Press

Full text available: pdf(216.72 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

The use of passwords is a major point of vulnerability in computer security, as passwords are often easy to guess by automated programs running dictionary attacks. Passwords remain the most widely used authentication method despite their well-known security weaknesses. User authentication is clearly a practical problem. From the perspective of a service provider this problem needs to be solved within real-world constraints such as the available hardware and software infrastructures. From a user' ...

15 Scalability in MMOGs: Towards public server MMOs



Chris Chambers, Wu-chang Feng, Wu-chi Feng

October 2006 **Proceedings of 5th ACM SIGCOMM workshop on Network and system support for games NetGames '06**

**Publisher:** ACM Press

Full text available: pdf(190.33 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

While massively multiplayer on-line games (MMOs) are enormously popular, their use of the client-server architecture causes them to suffer from scalability issues and high maintenance costs. In contrast, the public server architecture employed by most first-person shooter (FPS) games scales more easily by relying on user-supplied hosting and user-generated content, but lacks persistence between servers that is required in the MMO genre. This paper examines an architecture that leverages the r ...

**Keywords:** MMO, online games

16 Reception and posters: ARTiFACIAL: automated reverse turing test using FACIAL features



Yong Rui, Zicheg Liu

November 2003 **Proceedings of the eleventh ACM international conference on Multimedia MULTIMEDIA '03**

**Publisher:** ACM Press

Full text available: pdf(360.48 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Web services designed for human users are being abused by computer programs (bots). The bots steal thousands of free email accounts in a minute; participate in online polls to skew results; and irritate people by joining online chat rooms. These real-world issues have recently generated a new research area called Human Interactive Proofs (HIP), whose goal is to defend services from malicious attacks by differentiating bots from human users. In this paper, we propose a new HIP algorithm based on ...

**Keywords:** CAPTCHA, face and facial feature detection, human interactive proof (HIP), turing test, web services security

# 17 Demonstration session 2: Excuse me, but are you human?



Yong Rui, Zicheng Liu

November 2003 **Proceedings of the eleventh ACM international conference on Multimedia MULTIMEDIA '03**

**Publisher:** ACM Press

Full text available: pdf(175.38 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Web services designed for human users are being abused by computer programs (bots). The bots steal thousands of free email accounts in a minute; participate in online polls to skew results; and irritate people by joining online chat rooms. These real-world issues have recently generated a new research area called Human Interactive Proofs (HIP), whose goal is to defend services from malicious attacks by differentiating bots from human users. We propose a new HIP algorithm based on detecting human ...

**Keywords:** CAPTCHA, face and facial feature detection, human interactive proof (HIP), turing test, web services security

# 18 Email and security: Designing human friendly human interaction proofs (HIPs)



Kumar Chellapilla, Kevin Larson, Patrice Simard, Mary Czerwinski

April 2005 **Proceedings of the SIGCHI conference on Human factors in computing systems CHI '05**

**Publisher:** ACM Press

Full text available: pdf(471.32 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

HIPs, or Human Interactive Proofs, are challenges meant to be easily solved by humans, while remaining too hard to be economically solved by computers. HIPs are increasingly used to protect services against automatic script attacks. To be effective, a HIP must be difficult enough to discourage script attacks by raising the computation and/or development cost of breaking the HIP to an unprofitable level. At the same time, the HIP must be easy enough to solve in order to not discourage humans from ...

**Keywords:** completely automated public turing tests to tell computers and humans apart (CAPTCHAs), computer vision, evaluation, human interaction proofs (HIPs), human perception, visual letter recognition

# 19 Spam Filtering Based On The Analysis Of Text Information Embedded Into Images



Giorgio Fumera, Ignazio Pillai, Fabio Roli

December 2006 **The Journal of Machine Learning Research**, Volume 7

**Publisher:** MIT Press

Full text available: pdf(418.69 KB) Additional Information: [full citation](#), [abstract](#), [index terms](#)

In recent years anti-spam filters have become necessary tools for Internet service providers to face up to the continuously growing spam phenomenon. Current server-side anti-spam filters are made up of several modules aimed at detecting different features of spam e-mails. In particular, text categorisation techniques have been investigated by researchers for the design of modules for the analysis of the semantic content of e-mails, due to their potentially higher generalisation capability with ...



# 20 Q focus: cybercrime: Criminal code: the making of a cybercriminal



Thomas Wadlow, Vlad Gorelik

November 2006 **Queue**, Volume 4 Issue 9

**Publisher:** ACM Press

Full text available:  pdf(1.13 MB)  Additional Information: [full citation](#), [abstract](#), [index terms](#)  
[htm\(23.18 KB\)](#)

*Queue*'s first-ever narrative chronicles one man's transition from small-time hacker to big-time crook.

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